IN THE CLAIMS:

1. (original) A method of field detection comprising: providing a gradiometer in a field, the gradiometer having at least first and second field vector sensors connected in a differencing arrangement; and controllably altering a position of the at least first and second field vector sensors relative to the field during operation of the gradiometer.

2. (original) The method of claim 1 wherein the at least first and second field vector sensors of the gradiometer are substantially axially aligned, such that the gradiometer is an axial gradiometer.

3. (currently amended) The method of ~~claim 1 or~~ claim 2 wherein ~~the step of~~ controllably altering the position of the at least first and second field vector sensors is performed by rotating the at least first and second field vector sensors about an axis of rotation.

4. (currently amended) The method of claim 3 wherein ~~the step of~~ controllably altering the position of the at least first and second field vector sensors is performed by rotating the at least first and second field vector sensors continuously during operation of the gradiometer.

5. (canceled)

6. (currently amended) The method of claim 3 wherein ~~the step of~~ controllably altering the position of the at least first and second field vector sensors is performed by rotating the at least first and second field vectors piecewise about an axis of rotation.

7. (currently amended) The method of claim 3 ~~when dependent on claim 2 or any one of claims 4 to 6 when dependent on claims 2 and 3~~, wherein the axis of rotation is positioned substantially perpendicular to the axial alignment of the first and second field vector sensors, <u>substantially between the first and second field vector sensors, and substantially equidistant from the first and second field vector sensors.</u>

8-9. (canceled)

10. (currently amended) The method of ~~any one of the preceding~~ claims <u>1</u> wherein the gradiometer is an axial magnetic gradiometer<u>, and wherein the field vector sensors of the axial magnetic gradiometer are one of: SQUIDs, flux gates and superconducting pick up-loops.</u>

11-13. (canceled)

14. (currently amended) The method of ~~any one of~~ claims ~~10 to 13~~ 10 wherein the sensitivity vectors of the field vector sensors lie substantially in a nominal x-y plane, and wherein the axial magnetic gradiometer is rotated about a nominal z-axis perpendicular to the x-y plane.

15. (canceled)

16. (currently amended) The method of ~~any one of~~ claims ~~10 to 15~~ 10 further comprising ~~the step of~~ retrieving information relating to the magnetic field from the axial magnetic gradiometer as its position is controllably altered, such information comprising the g_{xy} component and linear combinations of the values of the g_{xx} and g_{yy} components of a field gradient tensor, in addition to information about the B_x and B_y field components.

17-19. (canceled)

20. (original) A field detection device comprising: a gradiometer, the gradiometer having at least first and second field vector sensors connected in a differencing arrangement; and means for controllably altering the position of the at least first and second field vector sensors relative to a field during operation of the gradiometer.

21. (currently amended) The device of claim 20, wherein the at least first and second field vector sensors of the gradiometer are substantially axially aligned, such that the gradiometer is an axial gradiometer.

22. (currently amended) The device of claim 20 ~~or claim 21~~, wherein the means for controllably altering the position of the at least first and second field vector sensors comprises means for rotating the at least first and second field vector sensors about an axis of rotation.

23. (currently amended) The device of claim 22 wherein the means for rotating the at least first and second field vector sensors about the axis of rotation is operable to rotate the at least first and second field vector sensors continuously during operation of the gradiometer.

24. (canceled)

25. (currently amended) The device of claim 22, wherein the means for rotating the at least first and second field vector sensors about the axis of rotation is operable to rotate the gradiometer piecewise about the axis of rotation.

26. (currently amended) The device of claim 22 ~~when dependent on claim 21 or any one of claims 23 to 25 when dependent on claims 21 and 22~~, wherein the axis of rotation is positioned substantially perpendicular to the c-axial first and second field vectors, <u>substantially between the first and second field vector sensors, and substantially equidistant from the first and second field vector sensors.</u>

27-28. (canceled)

29. (currently amended) The device of ~~any one of~~ claims 20 ~~to 18~~, wherein the gradiometer is an axial gradiometer, <u>and wherein the field vector sensors of the axial magnetic gradiometer are one of: SQUIDs, flux gates and superconducting pick up-loops.</u>

30-32. (canceled)

33. (currently amended) The device of ~~any one of~~ claims 29 ~~to 32~~ wherein the sensitivity vectors of the field vector sensors lie substantially in a nominal x-y plane, <u>and wherein the means for controllably altering the position of the at least first and second field vector sensors comprises means for rotating the at least first and second field vector sensors about a nominal z-axis perpendicular to the x-y plane.</u>

34. (canceled)

35. (currently amended) The device of ~~any one of~~ claims 29 ~~to 34~~ further comprising means for retrieving information relating to the magnetic field from the axial magnetic gradiometer as its position is controllably altered, <u>such information comprising the g_{xy} component and linear combinations of the values of the g_{xx} and g_{yy} components of a field gradient tensor, in addition to information about the B_x and B_y field components.</u>

36-38. (canceled)

39. (currently amended) ~~A~~ <u>The</u> method of <u>claim 1 for</u> obtaining a complete magnetic gradient tensor of a magnetic field, the method comprising: providing at least three axial gradiometers in the magnetic field such that an axis of each axial gradiometer is not parallel to an axis of any other one of the at least three gradiometers; and controllably altering a position of each of the at least three gradiometers relative to the magnetic field during operation of the gradiometer.

40. (currently amended) The method of claim 39 wherein ~~the step of~~ controllably altering comprises rotating each of the at least three axial gradiometers about a respective axis of rotation of that gradiometer, and wherein the axis of rotation of each gradiometer is not parallel to an axis of rotation of any other one of the at least three gradiometers.

41-43. (canceled)

44. (currently amended) The method of claim ~~43~~ 39 further comprising ~~the step of~~ distinguishing field gradient information from field information in the Fourier domain.

45. (currently amended) The method of claim ~~43 or claim 44~~ 40 further comprising distinguishing information about the gxy component of the gradient tensor from information due to the diagonal gradient components, even at the same frequency.

46-50. (canceled)

51. (currently amended) The method of ~~any one of~~ claims ~~42 to 50~~ 39 wherein DC offsets are determined and monitored to provide information about the operating conditions of the gradiometers, and wherein the DC offsets comprise one or both of: low frequency drift in at least one field vector sensor of the at least three gradiometers; and the fixed offset of at least one field vector sensor of the at least three gradiometers.

52-53. (canceled)

54. (currently amended) The method of ~~any one of claims 42 to 53~~ claim 39 wherein the at least three gradiometers are rotated at differing frequencies, in order to facilitate separation of their data signals in the Fourier domain.

55. (currently amended) ~~A~~ The device of claim 20 for obtaining a complete magnetic gradient tensor of a magnetic field, the device comprising:

at least three axial gradiometers positioned such that an axis of each axial gradiometer is not parallel to an axis of any other one of the at least three gradiometers; and

means for controllably altering a position of each of the at least three gradiometers relative to the magnetic field during operation of the gradiometer.

56. (currently amended) The device of claim 55 wherein the means for controllably altering are means for rotating each of the at least three axial gradiometers about a respective axis of rotation of that gradiometer, and wherein the axis of rotation of each gradiometer is not

parallel to an axis of rotation of any other one of the at least three gradiometers.

57-59. (canceled)

60. (currently amended) The ~~method~~ device of claim ~~58 or claim 59~~ 55 wherein the at least three gradiometers are rotated at differing frequencies, in order to facilitate separation of their data signals in the Fourier domain.

61. (canceled)

62. (currently amended) The device of ~~any one of claims 56 to 61~~ claim 55 further comprising means for detecting and measuring a DC offset, wherein the DC offset comprises one or both of: low frequency drift in at least one field vector sensor of the at least three gradiometers; and the fixed offset of at least one field vector sensor of the at least three gradiometers.

63-65. (canceled).

66. (currently amended) The device of ~~any one of claims 56 to 65~~ claim 55 further comprising means for distinguishing field gradient information from field information in the Fourier domain.

67-72. (canceled)